

Appl. No. 10/660,186
Amdt. dated April 13 2006
Reply to Office Action of December 15, 2005

Docket No. A01477

AMENDMENTS TO CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A curable mixture comprising at least one multi-functional Michael donor, at least one multi-functional Michael acceptor, and at least one anion of a Michael donor, wherein said curable mixture comprises 5% or less by weight non-reactive volatile compounds, based on the total weight of said curable mixture, wherein each Michael acceptor functional group in said multifunctional Michael acceptor is a residue of acrylic acid, methacrylic acid, fumaric acid, or maleic acid.
2. (currently amended) The curable mixture of claim 1 wherein said multi-functional Michael donor has at least two acetoacetoxy functional groups and wherein said multi-functional Michael donor has a skeleton selected from the group consisting of
(a) polyhydric alcohols that have ~~that has~~ molecular weight 200 or greater,
(b) oligomers that have weight-average molecular weight of 400 to 1,000, and
(c) polymers that have weight-average molecular weight of 1,000 or more.
3. (currently amended) The curable mixture of claim 1 wherein said anion of a Michael donor comprises a reaction product of an acetoacetoxy functional molecule of molecular weight 200 or greater with an alkali metal alkoxide, wherein said acetoacetoxy functional molecule has a skeleton selected from the group consisting of
(a) polyhydric alcohols that have ~~that has~~ molecular weight 200 or greater,
(b) oligomers that have weight-average molecular weight of 400 to 1,000, and
(c) polymers that have weight-average molecular weight of 1,000 or more.

Appl. No. 10/660,186
Amdt. dated April 13 2006
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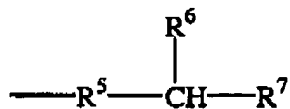
Docket No. A01477

4. (currently amended) The curable mixture of claim 1 wherein said multi-functional Michael acceptor comprises a poly-functional (meth)acrylate of molecular weight 5,000 or less has a skeleton selected from the group consisting of
- (a) polyhydric alcohols,
 - (b) oligomers that have weight-average molecular weight of 400 to 1,000,
and
 - (c) polymers that have weight-average molecular weight of 1,000 or more;
with the proviso that when said multi-functional Michael acceptor has said skeleton
(a), the molecular weight of said multi-functional Michael acceptor is 5,000 or less;
and with the further proviso that when said multi-functional Michael acceptor has
said skeleton (b) or said skeleton (c), the weight-average molecular weight of said
multi-functional Michael acceptor is 5,000 or less.
5. (original) The curable mixture of claim 1 wherein the reactive equivalent ratio of said curable mixture is in the range of 0.1:1 to 2:1.
6. (original) The curable mixture of claim 1 wherein the donor anion ratio of said curable mixture is in the range of 0.5% to 10%.
7. (withdrawn) A method comprising reacting a curable mixture comprising at least one multi-functional Michael donor, at least one multi-functional Michael acceptor, and at least one anion of a Michael donor, wherein said curable mixture comprises 5% or less by weight non-reactive volatile compounds, based on the total weight of said curable mixture.
8. (withdrawn) The method of claim 7 wherein said reacting is carried out by performing steps comprising
- (a) forming Pack A, which comprises said multi-functional Michael donor and said anion of a Michael donor,
 - (b) forming Pack B, which comprises said multi-functional Michael acceptor, and

Appl. No. 10/660,186
Amdt. dated April 13 2006
Reply to Office Action of December 15, 2005

Docket No. A01477

- (c) forming said curable mixture by mixing ingredients comprising said Pack A and said Pack B,
wherein said Pack A and said Pack B are each storage-stable, and wherein said curable composition has pot life in the range of 5 minutes to 8 hours.
9. (withdrawn) A method comprising applying a layer of a curable mixture to a substrate and contacting at least one additional substrate to said layer; wherein said curable mixture comprises at least one multi-functional Michael donor, at least one multi-functional Michael acceptor, and at least one anion of a Michael donor; and wherein said curable mixture comprises 5% or less by weight non-reactive volatile compounds, based on the total weight of said curable mixture.
10. (withdrawn) The method of claim 9, wherein said multi-functional Michael donor comprises an acetoacetoxy functional polymer of molecular weight 1,000 or greater; wherein said anion of a Michael donor comprises a reaction product of an acetoacetoxy functional polymer of molecular weight 1,000 or greater with an alkali metal alkoxide; wherein said multi-functional Michael acceptor comprises a poly-functional acrylate of molecular weight 1,000 or less; wherein the reactive equivalent ratio of said curable mixture is in the range of 0.1:1 to 2:1; and wherein the donor anion ratio of said curable mixture is in the range of 0.5% to 10%.
11. (new) The curable mixture of claim 1, wherein at least one of said anion of a Michael donor is an anion of a Michael donor that has the same composition as at least one of said multi-functional Michael donor.
12. (new) The curable mixture of claim 1 wherein at least one of said multi-functional Michael donor has two or more functional groups with the structure



Appl. No. 10/660,186

Docket No. A01477

Amdt. dated April 13 2006

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wherein R^5 is $\text{—}\overset{\text{O}}{\parallel}\text{C—}$ or $\text{—O—}\overset{\text{O}}{\parallel}\text{C—}$; R^7 is $\text{—}\overset{\text{O}}{\parallel}\text{C—R}^8$ or $\text{—}\overset{\text{O}}{\parallel}\text{C—O—R}^8$ or $\text{—C}\equiv\text{N}$; and R^6 and R^8 are, independently, H, alkyl, aryl, or alkaryl.

13. (new) The curable mixture of claim 12 wherein at least one of said multi-functional Michael donor is selected from the group consisting of
 - (i) polyhydric alcohols in which one or more hydroxyl group is linked to an acetoacetate group through an ester linkage, and
 - (ii) compounds containing one or more functional groups selected from the group consisting of acetoacetate, acetoacetamide, cyanoacetate, and cyanoacetamide; wherein said functional groups are attached to one or more skeleton selected from the group consisting of castor oil, polyester polymer, polyether polymer, acrylic polymer, methacrylic polymer, and polydiene polymer.
14. (new) The curable mixture of claim 2 wherein said polyhydric alcohol is selected from the group consisting of alkane diols, alkylene glycols, glycerols, sugars, pentaerythritols, polyhydric derivatives thereof, and mixtures thereof.
15. (new) The curable mixture of claim 2 wherein at least one said multi-functional Michael donor has a skeleton is a polyhydric alcohol that has molecular weight of 200 or more.
16. (new) The curable mixture of claim 1 wherein alkali metal hydroxides, alkali metal alkoxides, quaternary ammonium hydroxides, diaza compounds, guanidine compounds, amidines, pyridine, and imidazoline are absent or substantially absent from said mixture.

Appl. No. 10/660,186
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Docket No. A01477

17. (new) The curable mixture of claim 4 wherein said polyhydric alcohol is selected from the group consisting of alkane diols, alkylene glycols, glycerols, sugars, pentaerythritols, polyhydric derivatives thereof, and mixtures thereof.
18. (new) The curable mixture of claim 4 wherein at least one of said multi-functional Michael acceptors has a skeleton that is a polyhydric alcohol.
19. (new) The curable mixture of claim 1 wherein said multi-functional Michael acceptor has a skeleton selected from the group consisting of
- (a) polyhydric alcohols,
 - (b) oligomers that have weight-average molecular weight of 400 to 1,000, and
 - (c) polymers that have weight-average molecular weight of 1,000 or more;
- with the proviso that when said multi-functional Michael acceptor has said skeleton (a), the molecular weight of said multi-functional Michael acceptor is 2,000 or less; and with the further proviso that when said multi-functional Michael acceptor has said skeleton (b) or said skeleton (c), the weight-average molecular weight of said multi-functional Michael acceptor is 2,000 or less.
20. (new) The curable mixture of claim 1 wherein said multi-functional Michael acceptor has a skeleton selected from the group consisting of
- (a) polyhydric alcohols, and
 - (b) oligomers that have weight-average molecular weight of 400 to 1,000;
- with the proviso that when said multi-functional Michael acceptor has said skeleton (a), the molecular weight of said multi-functional Michael acceptor is 1,000 or less; and with the further proviso that when said multi-functional Michael acceptor has said skeleton (b), the weight-average molecular weight of said multi-functional Michael acceptor is 1,000 or less.